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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/550,331 04/14/00 TANAKA

T 0023--1785-3

EXAMINER

IM22/0815
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TRAN. L	PAPER NUMBER
ART UNIT	

1725
DATE MAILED:

08/15/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Applicati n No.		Applicant(s)	
	09/550,331		TANAKA ET AL.	
	Examiner		Art Unit	
	Len Tran		1725	

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-9, 17, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono (US Patent No. 5,836,372) in view of Wang et al (US Patent No. 5,501,266) and Bradley et al (US Patent No. 5,040,589).

As to claims 1-7, 9, 17 and 21 Kono discloses a plunger (45) moving in the horizontal direction is disposed in the second channel (figure 1), with the check valve (60) is disposed in the first channel for preventing metal in the second channel flowing backward to the first channel

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(figure 1). However, Kono fails to disclose a screw extruder at the first channel and a clamping device after the nozzle.

Wang et al discloses a method and apparatus of injection molding of semi solid metals comprising a screw extruder (8) located substantially vertically and having an extrusion screw (18) rotationally at the inside of a chamber (19) (col 5, lines 8-12); a cooling unit (24) for cooling a light metal material supplied in the chamber so as to be formed into a molten metal or semi solid solidified slurry (col 5, lines 20-24). The chamber also comprises a heating unit (25) for heating the material inside. A nozzle (28) connected at a base end thereof to a discharge port of the chamber and having a discharge port formed at a distal end thereof (col 5, lines 25-27); a hopper (1) is for storing the molten metal connected to an upper portion of the chamber (19) (col 4, line 51); the screw extruder (8), which is heat resistant to molten metal, has an injection function of moving the extrusion screw in the axial direction to inject the molten metal or semi solidified slurry (fig 3); wherein the round portion is formed to a joined portion between the first channel and the second channel for smoothly turning the direction of the molten metal (fig 3); wherein a check valve is formed at the end of the screw comprises a central shaft rotably inserted in the chamber and a plurality of screw segments fitted over the outer circumference of the central shaft and arranged in the axial direction (col 5, lines 16-19).

Wang et al teaches the above differences, a screw extruder, in order to break the growing dendrites of the solid phase into small and nearly spherical particles by the shearing force generate by the screw in the barrel.

Therefore, it would have been obvious to provide Wang et al's screw extruder in Kono because the extruder is use to break the growing dendrites of the solid phase into small and nearly spherical particles by the shearing force for producing a strong product.

Bradley et al discloses a clamping device (22) is adapted to open or close a movable mold relative to a stationary plate. The mold halves define a suitable cavity (27) in communication with the nozzle having a slitwise channel (figure 1, col 3, lines 35-54). Bradley teaches the use of the clamping device in order to form or shape the final product.

Therefore, it would have been obvious to provide a clamping device as taught by Bradley et al, in Wang et al in order to form and shape the final product.

As to claim 8, it would have been obvious to one having ordinary skill in the art at the time applicant's invention was made to have a compression ratio of 1, since the related arts teach extrusion resulting in compression of the molten metal. Therefore, it would have depended on the design expediency and regarding to time constraint, increasing or decreasing compression ratio would result in fast or slow production of the metal product.

In addition, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have a compression ratio of 1, since it has been held that an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

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4. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono (US Patent No. 5,836,372) in view of Wang et al (US Patent No. 5,501,266) Bradley et al (US Patent No. 5,040,589) and Rock (US 3,773,098).

As to claims 10-15, Kono, Wang et al, and Bradley et al disclose the claimed invention above in paragraph 3, but fails to mention a static mixer disposed in the nozzle. Kono discloses a heating member disposed at the periphery of the nozzle for setting the temperature of the light metal for forming a solid plug (col 4, lines 46-57), but fails to disclose a static mixer in the nozzle.

Rock discloses a static mixer with stirring blades connected in front of a nozzle (figure 4, col 1, lines 23-33) for the purpose of having efficient and uniform mixing at the nozzle prior to the mold for producing the final product.

Therefore, it would have been obvious to one of ordinary skill in the art to provide a static mixer as taught by Rock, in Kono, Wang et al, and Bradley et al because it allows efficient and uniform mixing prior to molding.

5. Claims 18-20, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono (US Patent No. 5,836,372), Wang et al (US Patent No. 5,501,266) Bradley et al (US Patent No. 5,040,589) and Mercer, II et al (US 5,388,633).

As to claims 18, 20 & 23, Kono, Wang, and Bradley fail to disclose a melting furnace for heating the solid material into molten metal and a supply unit for supplying the molten metal in

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the melting furnace by way of a supply pipeline shielded with an inert gas to the hopper; a level sensor for detecting the surface height and a control device for controlling the amount of the molten metal supplied to the hopper based on the signal from the level sensor.

Mercer, II et al discloses a melting furnace (10) for heating molten metal and being located substantially at the identical ground level with that of clamping device (68), and a molten metal supply unit for supplying the molten metal in the melting furnace (10) by way of a supply pipeline shielded (16) with an inert gas to the injection sleeve (col. 8, lines 64-69).

Although Mercer, II et al teaches molten metal deliver to the injection sleeve, it would also have been capable of supplying to a hopper and then to the injection sleeve, wherein both concept would result in the same outcome.

Mercer, II et al teaches the above differences in order to meet the demands of rapid and consistent fabrication of high quality die cast parts (col. 3, lines 41-44).

Therefore it would have been obvious to one of ordinary skill in the art to have provide Mercer, II et al's apparatus in Kono, Wang, and Bradley et al in order to achieve rapid and consistent fabrication of high quality die cast parts.

As to claim 19, although, Mercer, II et al did not teach a level sensor for detecting surface height in a hopper, and a control device for controlling the amount of molten metal supplied to the hopper based on the signal from the level sensor. However, Mercer, II et al teaches measuring the amount of molten metal supplying into the shot sleeve, and a control device for controlling the amount of the molten metal supplied from the melting pot to the shot sleeve (col. 11, lines 54-69 through col. 12, lines 1-11).

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Therefore, with this disclosure, one of ordinary skill in the art at the time applicant's invention was made to use Mercer, II et al's control device in either arrangement and would result in the same final result.

Response to Arguments

6. Applicant's arguments filed on 6/12/01 have been fully considered but they are not persuasive.

1. on page 5, 2nd paragraph through page 6, 1st paragraph, applicant argues that it would have not been obvious to combine Kono with Wang, since "Kono's mixer 32 does not have a shearing function, and since the mixer of Kono does not perform the function of the screw of Wang et al, those skilled in the art would not have been motivated to replace the mixer 32 with a screw." Examiner respectfully disagrees. It is known and conventional in the art that a mixer does have a characteristic or functionally capable of performing shearing of slurries or semi-solid metal. Therefore, applicant's argument is moot, and that those skilled in the art would have been motivated to replace the mixer 32 with a screw.

2. on page 6, 2nd paragraph, applicant argues that "it would be contrary to the teachings of Kono to modify the vertical barrel to use a feed screw since this would negate the purpose of its vertical orientation." As stated by applicant that vertical arrangement is for the purpose of gravity feed. Examiner agrees with applicant with its purpose. However, adding a screw as taught by Wang is to break the growing dendrites of the solid phase into small and nearly

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spherical particles so that the metal product can be stronger. Therefore, adding a screw does not negate the purpose of its vertical orientation, since molten metal is still gravity fed.

3. on page 6, 3rd paragraph through page 7, applicant's argument is moot based on the above explanation of section 1 and 2.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Len Tran whose telephone number is (703)605-1175. The examiner can normally be reached on M-F, 8:30 - 5.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 703-308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3602 for regular communications and (703)305-3602 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Len Tran
Examiner
Art Unit 1725

LT
August 10, 2001


M. Alexandra Elue
Patent Examiner
TC1700